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# OXIDATIVE STRESS STATUS—THE SECOND SET

WILLIAM A. PRYOR
Biodynamics Institute, Louisiana State University, Baton Rouge, LA, USA

In the December 1999 issue of *FRBM* (volume 27, numbers 11/12), we presented the first group of seven papers in a Forum on Oxidative Stress Status (OSS). In my introduction, I explained that this OSS Forum eventually will include a substantial number of papers, which will be published in batches as they are completed and pass through the refereeing process.

In this issue, *FRBM* is pleased to present the second group of four papers that are a part of this OSS Forum. This Forum leads off with a contribution from the Vanderbilt group that has developed methodology for detecting isoprostanes. I had predicted in 1975–1976 that isoprostanes would be formed, and that some would have biological activity [1,2], but it took the inspiration, the marvelous applications of separation science, and the development of exquisite analytical techniques by the group of Roberts, Morrow, and their associates to bring this technique to life [3]. It now appears that levels of isoprostanes may be the most reliable method of measuring OSS. In the first article in this Forum, a precis of this exciting development is presented by its discoverers.

The second article reviews the technique of measuring ethane and pentane in expired breath. This is an extremely promising method, because it is noninvasive and can be done as a function of time. It suffers, however, from the relatively small differences between elevated values and control values, as these hydrocarbon gases are ubiquitous. The analytical techniques required, therefore, are exacting. The review of this technology by Knutson and his associates presents some new insights into this method.

The years preceding our entrance into the 21st century were enlivened by the discovery that reactive nitrogen species (RNS) are as commonplace and important in cells as are our somewhat older friends, the reactive oxygen species (ROS). This discovery stems, of course, from the ground-breaking concept that nitric oxide is a signal molecule, a discovery that lead to the awarding of the Nobel Prize to Louis Ignarro, Ferid Murad, and Robert Furchgott. Shortly after our attention was centered on the new kid on the free radical block, •NO, Beckman and his associates pointed out that •NO and superoxide were both radicals, are often produced by the same cells, and combine at nearly the diffusion limit. Thus, the biochemistry of the combination product of nitric oxide and superoxide, peroxynitrite ($O{=}N\text{-}O\text{-}O^-$), sprang on the scene. The pioneer explorers Irwin Fridovich and Joe McCord set sail and discovered the large and important "continent" in free radical biology called superoxide, and years of exciting trading with the newly discovered "natives" followed. It appears that the "brother continent" of RNS will produce even more exciting discoveries. A good bit of attention in recent years has centered on developing a biomarker for peroxynitrite activity, and the one most often studied is nitrotyrosine. In the third contribution in this Forum, Kenneth Hensley and his associates at Oklahoma present analytical methods for the detection of both nitrotyrosine and nitro-γ-tocopherol.

The final contribution in this set of OSS articles is by H. M. Shen and C. N. Ong, who discuss the detection of oxidized DNA, including 8-oxodeoxyguanosine, in human sperm. Preserving viable sperm has become increasingly important in recent years, as techniques for aided conception have advanced.

The editors of *FRBM* hope you enjoy this second set of our OSS Forum. Another, considerably larger group of papers will appear in the coming few months—even though this is the second set, we are still a good distance from the end of the match.

Address correspondence to: Dr. William A. Pryor, Biodynamics Institute, 711 Choppin Hall, Louisiana State University, Baton Rouge, LA 70803, USA.

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